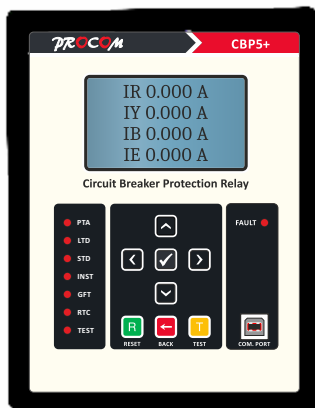


Circuit Breaker Protection Relay CBP5+



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1.0 Circuit Breaker Protection Relay

CBP5+ is the multi functional protection unit, using advanced micro-controller with full benefits of micro processor technology offering over load & short circuit protection function, advance protection function, measurement & advanced monitoring function, LCD display, MODBUS communication etc.

It should be noted that the reference current for this release is I_{ct} (i.e. rated current of the CT) mounted in the circuit breaker and not the I_r (the rated current of the circuit breaker, or ILTD). CBP5+ is self-powered meaning it does not require any external power supply for its basic functioning (LSIG). Though Min. current required to power up the device is 30% of I_{CT} But, it is recommended to connect 12-24 Vdc external supply with CBP5+ for taking the maximum benefit of its features.

Basic Protection Functions available in CBP5+ are

- LTD: Overload protection with inverse long time delay
- STD: Short circuit with adjustable delay
- INST: Instantaneous short circuit
- GFT: Earth fault with adjustable delay

2.0 Specification & Functions

CBP5+ unit can be installed on 3-pole, 3-pole with external neutral or 4-pole circuit breakers.

• Overload function (LTD)

LTD Current	OFF, 40% to 100% of I_r
LTD Time	0.5 sec to 30 sec.

• Short Circuit function (STD)

STD Current	OFF, 100% to 1000% of I_r
STD Time	50ms to 600ms.

• Instantaneous function (INST)

INST Current	OFF, 200% to 1600% I_r
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• Ground fault function (GFT)

GFT Current	OFF, 10% to 100% I_r
GFT Time	50ms to 1000ms.

• Advanced protection features

Over Voltage	Under Voltage
Over Frequency	Under Frequency
Unbalanced Voltage	Phase Sequence
Protection	

3.0 Advanced In-built Measurement Module

Current (Both line & phase)

Voltage (Both line & phase)

Frequency

Apparent Power

Real Power

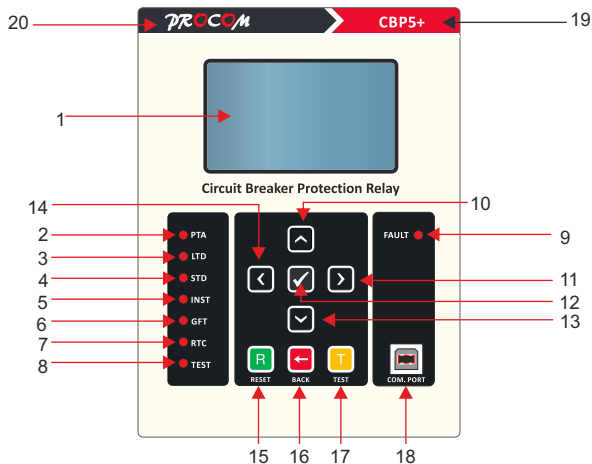
Reactive Power

Power Factor

Ambient Temperature

- Pre-trip Alarm
- Thermal Memory
- Bar Graphs for Current & Voltage
- Zone Selective Interlocking
- Making Current Release Function
- I2t ON/OFF Feature
- Contact Erosion Indicator
- Ready to Close Feature (Provided on request)
- Circuit Breaker Fail Feature
- Downstream CB Fail Feature
- Digital Operation Counter
- Fault History on Display
- Wide LCD Display
- LED Annunciations on Front Fascia
- RS-485 MODBUS Communication Facility






4.0 Front Facia






Ref.	Description	Ref.	Description
1	LCD Screen	11	Scroll "Right" Push Button
2	LED for "PTA (Pre-Trip Alarm)"	12	Enter / Save Push Button
3	LED Indication for LTD Fault	13	Scroll "Down" Push Button
4	LED Indication for STD Fault	14	Scroll "Left" Push Button
5	LED Indication for INST Fault	15	Reset Push Button
6	LED Indication for GFT Fault	16	Back Push Button
7	*LED for "RTC (Ready to Close)"	17	Test Push Button
8	LED for "Test ON"	18	Comm Port
9	LED for "Faults"	19	Product Identification Code
10	Scroll "Up" Push Button	20	PROCOM LOGO

*LED is functional only when RTC feature is requested

5.0 Switches Description

Switch Symbol	Switch Function	Description
	UP	To increment the value and for scrolling Up
	DOWN	To decrement the value and for scrolling Down
	NEXT	Normal Display Mode: It is used to scroll/ change the parameters displayed on LCD View/Edit Parameter Mode: Next/Previous key is
	PREVIOS	used to scroll/ go to the next/previous parameter to be programmed
	ENTER / SAVE	Normal Display Mode: To enter into the selected (enlarged) Tab of the MENU Edit Parameter Mode: To save the settings done

	BACK	To go back to the previous MENU Tab Bar
	TEST	To activate the fault condition (test case) in TEST MODE.
	RESET	To reset the Fault signals on the Release.

6.0 LED Annunciations Description

Nomenclature	Description
POWER	Power ON
CBP FIT	Release continuously monitors its own electronic circuit and indicates its healthy condition by glowing
RTC#	Breaker is Ready to Close (make ON)
TEST	TEST MODE is activated
PTA*	For Pre-Trip Alarm
FAULT*	For faults other than LTD, STD, INST and GFT
LTD*	Tripping due to Overload (Long Time Delay)
STD*	Delayed Tripping due to Short Circuit fault (Short Time Delay)
INST*	Instantaneous Tripping due to Short Circuit fault (Instantaneous)
GFT*	Tripping due to Ground Fault

*Blinking: When fault/alarming condition is sensed and waiting for the activation of Tripping/Alarm blowing

*Continuously Glowing: Activation of Tripping/Alarm blowing on the corresponding fault/alarming condition

#Optional Feature which is functional only when RTC feature is requested. This also includes the feature of displaying the ACB Status on default screen.

7.0 Navigation Procedure

Press NEXT & PREVIOUS switches simultaneously. View Parameter Edit Parameter Fault History Contacts Status Adjust Clock Change Password Reset Peak MD Reset Energy The LCD Screen shall display the Tabs of MAIN MENU as below:

View Parameter
Edit Parameter
Fault History
Contacts Status
Adjust Clock
Change Password
Reset Peak MD
Reset Energy

Press UP and DOWN switches to scroll through these Tabs. The selected Tab will be of enlarged size. To enter the selected Tab, press the ENTER switch.

8.0 View Parameter

It Displays the currently fed/set values for the threshold of all the parameters. These can be seen one by one on scrolling using the NEXT and PREVIOUS switches.

Fault History:

The data of last 10 faults can be directly viewed on the LCD screen of the Intelligent Protection Release only. This data includes the type of fault with date and time stamping along with the current, voltage and frequency values of the system during the breaking of the fault. These can be seen by scrolling one after the other using NEXT and PREVIOUS switches.

Contacts Status:

It indicates the number of operations (endurance) done on the ACB. It also indicates the erosion (in percentage) of the Arcing contacts occurred during its service condition. If it is above 90%, then it will suggest the user to replace the arcing contacts through a message 'Service Contacts' on the default screen.

Adjust Clock:

Go to the required field using the NEXT and PREVIOUS switches. And to change the value of that field, use the UP and DOWN switches.

Change Password:

It will first ask to enter the password (existing), enter it using the UP and DOWN switches and then press

ENTER switch. Then enter the new password using the UP and DOWN switches and press ENTER

switch to proceed. Then it will ask for a confirmation, whether to save it (press UP switch) or to escape (press DOWN switch).

Reset Peak MD

Go to the required field using the NEXT and PREVIOUS switches. It will ask to enter the password. After entering the password, the LCD shall display **Press**

Key

Enter To Erase Back To Quit

The unit shall ask for confirmation to reset peak MD by pressing desired Switch.

Reset Energy

Go to the required field using the NEXT and PREVIOUS switches. It will ask to enter the password. After entering the password, the LCD shall display **Press**

Key

Enter To Erase Back To Quit

The unit shall ask for confirmation to reset energy by pressing desired Switch.

9.0 Edit Parameter

To enter into the “Edit Parameter” Tab, it will ask for a password. Enter the password using the UP and DOWN switches, and then press the ENTER switch. Different Parameters can be viewed by scrolling using the NEXT and PREVIOUS switches. And the value of each parameter can be changed by using the UP and DOWN switches. After making the required changes, press the ENTER/SAVE switch to save the changes. By default, the password is “1” and it is recommended to change the password immediately after installation of the ACB for security reasons.

Following is the table for the description of “Edit Parameter”:

Parameter	Explanation of Parameter	Factory Setting	Setting Range
LTD (xIn)	The maximum current level above which the circuit breaker senses it as an overload	1	0.40-1.00
LTD DELAY (sec)	Duration for which Overload condition can be tolerated before tripping	15	0.5-30.0
STD (xIn)	The maximum current level above which the circuit breaker senses it as short circuit fault (with delayed tripping)	4	1.0-10.0
STD DELAY (sec)	Duration for which short circuit fault (STD) can be tolerated before Tripping	0.4	0.04-0.60
I2T(STD)	To set definite or inverse type time current characteristics	Disable	Enb/Dis
INST (xIn)	The maximum current level above which the circuit breaker senses it as short circuit fault (with instantaneous tripping)	6	1.1-16.0
GFT (xIn)	The maximum current level above which the circuit breaker senses it as ground fault	1	0.10-1.00
GFT DELAY (sec)	Duration for which Over Current GFT (xIn) condition can be tolerated before Tripping	1	0.05-1.00
I2T(GFT)	To set definite or inverse type time current characteristics	Disable	Enb/Dis
REF (xIn)	The maximum current level above which the circuit breaker senses it as REF fault	1	0.10-1.00
REF DELAY (sec)	Duration for which Over Current REF (xIn) condition can be tolerated before Tripping	1	0.05-1.00
I2T(REF)	To set definite or inverse type time current characteristics	Disable	Enb/Dis
CBF DELAY (sec)	After the initiation of Trip command, if the ACB doesn't trip due to any reason, then after this CBF delay, it will immediately give trip command to its upstream breaker	0.1	0.05-1.00
Under Voltage(V)	Minimum permissible voltage, below this the system voltage is treated unhealthy	216	150-250
UV Delay (sec)	Duration for which the under voltage condition can be tolerated before tripping	10	0.09-60

UV Hysteresis %	Hysteresis on the threshold value of under voltage condition	2	1.0-25.0
Over Voltage (v)	Maximum permissible voltage, above this the system voltage is treated unhealthy.	264	201-300
OV Delay (sec)	Duration for which the over voltage condition can be tolerated before tripping	10	0.09-60
OV Hysteresis %	Hysteresis on the threshold value of over voltage condition	2	1.0-25.0
Under Freq(HZ)	Minimum permissible Mains Frequency below which it is treated as unhealthy	48	45.1-50.0
UF Delay (sec)	Duration for which the under frequency condition can be tolerated before tripping	2	0.5-30
UF Hysteresis %	Hysteresis on the threshold value of under frequency condition	0.2	0.1-1.0
Over Freq(HZ)	Maximum permissible Mains Frequency above which it is treated as unhealthy	52	50.1-55.0
OF Delay (sec)	Duration for which the over frequency condition can be tolerated before tripping	2	0.5-30
OF Hysteresis %	Hysteresis on the threshold value of over frequency condition	0.2	0.1-1.0
Vol Unbalance %	Maximum permissible voltage unbalancing above which it is treated as unhealthy	5	2.1-90.0
VU Delay (sec)	Duration for which the voltage unbalancing condition can be tolerated before tripping	10	1-100
Phase Sequence	This ensures that the sequence of phases is correct when connecting 3 phase loads. On detection of incorrect phase sequence, the circuit breaker trips.	Disable	E/D
PTA Pickup (xI _r)	The maximum current level above which the circuit breaker senses it as an alarming stage before the overload (LTD) condition is actually reached	0.95	0.60-0.95
PTA DELAY (sec)	Duration for which Pre-Trip Alarm condition can be tolerated before the activation of the pre-trip alarm.	10	0.1-30.0
PTA Dropoff (xI _r)	The current level below which the circuit breaker stops sensing/ blowing of pre-trip alarm	0.9	0.49-0.95

MCR (xIn)	The maximum current level above which the circuit breaker senses it as an short circuit fault while making of the contacts of ACB and trips it immediately	5	1.0-12.0
Over Temp (°C)	The maximum temperature level above which the circuit breaker senses it as an over temperature fault while making of the contacts of ACB and trips it immediately	75	61-75
Thermal Memory	The release remembers recent over current events and protects the distribution system from cumulative overheating caused by repeated over current conditions	Disable	Enb/Dis
Device ID	The unique unit address or ID assigned to each ACB (device) in the network	1	1-247
Baud Rate	The rate at which the information is to be transferred in the communication channel	9600	1200-19200
Parity	The technique through which it is to be checked whether data has been lost or written over when it is transmitted or moved from one place in storage to another one	NONE	NONE, ODD, EVEN
No of Stop bits	Type of stop bit used to signal the end of a frame (set of bits that are transmitted sequentially by the transmitter)	1	1, 2
Disp Auto Scroll	Auto Scrolling of the system parameters to be displayed on the default screen	On	On/Off
Test Mode	To enter into the TEST MODE to check the functioning of the Release	Disable	Enb/Dis
MD Interval	In selected interval release pick the maximum value in this period	15	1-120

Ann LTD**	Potential Free Output	No Ann	On Contact 1-8
Ann STD**	Potential Free Output	No Ann	On Contact 1-8
Ann INST**	Potential Free Output	No Ann	On Contact 1-8
Ann GFT**	Potential Free Output	No Ann	On Contact 1-8
Ann REF**	Potential Free Output	No Ann	On Contact 1-8
Ann Over Vol**	Potential Free Output	No Ann	On Contact 1-8
Ann Under Vol**	Potential Free Output	No Ann	On Contact 1-8
Ann Down Stream**	Potential Free Output	No Ann	On Contact 1-8
Ann Over Freq**	Potential Free Output	No Ann	On Contact 1-8
Ann Under Freq**	Potential Free Output	No Ann	On Contact 1-8
Ann Vol Unbal**	Potential Free Output	No Ann	On Contact 1-8
Ann Phase Seq**	Potential Free Output	No Ann	On Contact 1-8
Ann CB Fail**	Potential Free Output	No Ann	On Contact 1-8
Ann devise Fit**	Potential Free Output	No Ann	On Contact 1-8
Ann OTP Fail**	Potential Free Output	No Ann	On Contact 1-8
Ann Ready to Close**	Potential Free Output	No Ann	On Contact 1-8
Ann Test On**	Potential Free Output	No Ann	On Contact 1-8
Ann Common Fault**	Potential Free Output	No Ann	On Contact 1-8

** Applicable only when Relay Card is used with the release of the ACB

10.0 Communication Facility

For MODBUS communication (via RS-485), the D+ and D- pins are available on the back side which the ACB is connected to the communication system.

11.0 Measurement Module

Measurement module is displayed on the default Main Screen which can be scrolled using the NEXT and PREVIOUS switches. These will be displayed as below:

IR	A
IY	A
IB	A
IN	A

R-Y	V
Y-B	V
B-R	V

VR	V
VY	V
VB	V

0	50	100%
Ir		
Iy		
Ib		

0	50	100%
Vr		
Vy		
Vb		

Hz

R	___kW
Y	___kW
B	___kW
T	___kW

R	___kVA
Y	___kVA
B	___kVA
T	___kVA

R	___kVAr
Y	___kVAr
B	___kVAr
T	___kVAr

R	___PF
Y	___PF
B	___PF
T	___PF

Ambient Temp	ACB Status	YES / NO
___Deg. C	D/O Inserted	YES / NO
	CB Charged	YES / NO
	CB Closed	YES / NO

Supply Status	
Voltage	UV / OK / OV
Frequency	UF / OK / OF
Ph Seq	OK / NOT OK

Last Fault	Type of Fault	___
	___	___
	___	___

Note:

In case of fixed type ACB, the terminals D/O INTACT (59) and COMMON (60) are shorted at the CBP only (at manufacture's end). The display will always show "D/O Inserted YES".

The "ACB Status" indication on display is functional only when RTC feature is requested. If not requested, then the display will show all the parameters as "NO".

Field Test Function

Enter the EDIT PARAMETER tab, press NEXT to scroll to the TEST MODE and enable it. Ensure that the 12-24 V D.C. Auxiliary Supply is connected at the terminals 51 & 52.

For checking overload function, enable the LTD function and disable the other basic protection functions (STD, INST and GFT).

Now, press the "TEST" Switch to activate the test condition. The breaker will trip (due to LTD fault) as per the time setting done for LTD time function, making the "Fault" & "LTD fault" LEDs to glow continuously. Perform the same test for other overload time settings and for the protection functions also.

After completing the field testing, enter the EDIT PARAMETER tab, press NEXT to scroll to the TEST MODE and disable it.



Activate Test Condition

Reset Function When the breaker trips, the corresponding fault LED indication will continue to glow in case the external auxiliary supply is present. Pressing "Reset" button will reset the fault LED indication.



Activate Test Condition

⚠ Caution: In case if the TEST MODE is ON, nuisance tripping may occur during normal operating conditions. So, ensure that the TEST MODE is OFF during normal operating conditions. This can be verified from TEST LED on front fascia.

12.0 Wiring Connection



MHT		NC	NC	IN		IB		IY		IR	
+VE	-VE			S2	S1	S2	S1	S2	S1	S2	S1



12V DC		COMMON	DOWN CB FAIL	ZONE BLOCK	CB CLOSED	D/O INTACT	COMMON	SPRING CHARGED	CB OPEN	NOT CONNECT	NOT CONNECT
+VE	-VE										

PTA	ZONE	CB FAIL	CB CLOSED
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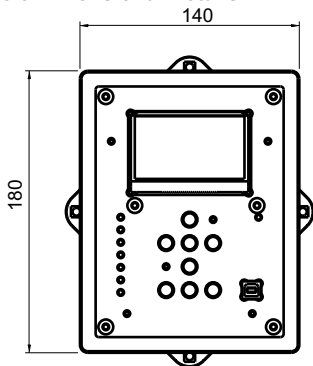
Vr Vy Vb Vn



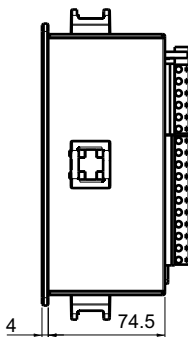
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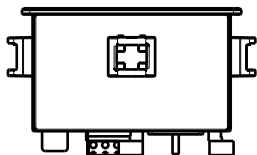
13.0 Dimensional Details



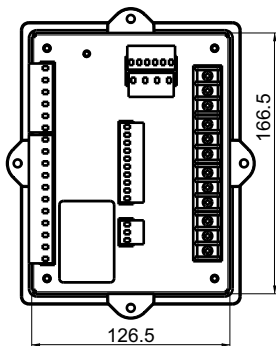
Front view



Right view



Bottom view



Back View

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